Calculation of fix-rate bias for automated telemetry systems

60th Annual Conference of the New Zealand Statistical Association, September 2009, Wellington, NZ

Miriam Hodge, Jennifer A. Brown and Marco Reale

Department of Mathematics and Statistics
University of Canterbury
Private Bag 4800
Christchurch

GPS and other radio tracking equipment are becoming more widely used by researchers for modelling animal habitat. In a typical monitoring program an animal will be fitted with a tracking collar. This tracking collar will fix the animal's location at a set time interval. These fixes of the animal's location can then be cross referenced on a digital map (GIS) containing habitat information and the animal's preferred habitat can be modelled.

Care must be used in modelling the habitat because radio tracking collars have different transmission probabilities in different habitats. The habitat observations are biased towards habitats that allow good transmission. One way to minimise this bias is to weight observations by a measure of transmission quality.

Researchers have attempted to estimate the detection weighting by placing stationary collars in the study area and recording the fix-rate. The results of these studies are unsatisfactory because stationary collars do not account for animal movement and behaviour. Johnson (1998) used a surrogate for stationary collars by analysing 6 hour time periods where the animal was relatively stationary. We will develop this method further by incorporating the non-stationary sites in the detection rate calculation.